

Appl. No. 10/617,469
Amdt. Dated 03/28/2006
Reply to Office Action of December 28, 2005

REMARKS/ARGUMENTS

In response to the outstanding office action, claims 8, 9 and 24 have been canceled and new claims 25 through 27 have been added.

In the outstanding office action, the examiner rejected claims 1, 8-10 and 13 on Nakano in view of Jin. Claims 8 and 9 have been canceled herein, and new claims 25 through 27 have been added. In that regard, new claim 25 sets forth the limiter of the present invention in the form of an amplifier having a gain variable with the amplitude of a signal applied to the amplifier, with claims 26 and 27 providing more specificity about the gain variation with signal amplitude and of the amplifier construction, respectively. In the rejection, the examiner equated the amplifier of Nakano with the limiter of the present invention. It is respectfully submitted that the examiner is misreading Nakano. The undersigned acknowledges that Nakano does amplify the desired signal with a higher gain than it amplifies the leakage signal as was claimed in now canceled claim 8. However Nakano uses a tuned amplifier, not an amplifier having a gain responsive to signal level, with Nakano changing the tuning responsive to the signal coupled thereto (see Fig. 1 and col. 4, lines 2-40 referred to by the examiner). The method of Nakano should work well with frequencies that are well separated, as in the 800 MHz and 1600 MHz examples of Nakano. However this does not work well if the frequencies are not well separated, as in frequency hopping receivers wherein the frequencies are close together. The present invention, on the other hand, works well regardless of the frequency separation, and particularly when the frequency separation is a small percentage of the basic frequency "(i.e. $\Delta\omega \ll \omega$)" (paragraph 0032). For example, in the case of a GSM system that uses frequency hopping, the two signals that are switched are separated by as little as 1MHz. While the signals themselves are at 1800 MHz in a cellular system, their very narrow spectral separation cannot be treated separately by frequency selective circuits. However in the present invention, a limiter (nonlinear amplifier) discriminates in favor of the larger signal at the expense of the smaller signal, regardless of how small the frequency separation is. For instance, in a preferred embodiment of the present invention, by converting the "selected" carrier and "leaky carrier" to a differential signal (via a transformer) and using a differential limiting amplifier, the high isolation can be achieved.

Further, the single-ended amplifiers used by Nakano do not limit well (when hit by large signal they distort the waveforms and also rebias the amplifier). That is why Nakano has to depend on linear Gain when using a tuned circuit. Nakano does not address the scenario of isolation of signals with small frequency separation or exploitation of non-linear gain to achieve the goals.

Thus the limiter of claims 1 and 10 effect gain versus signal amplitude to effect relative gain between a desired signal and leakage of an undesired signal, even for frequencies with little separation, whereas the prior art provides a similar gain disparity result if the frequencies are sufficiently different by retuning the amplifier to be more responsive to the frequency of the signal to be amplified than the frequency of the leakage.

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New claim 25 claims the limiter in the form of an amplifier having a greater gain to the larger signal component, with claim 26 limiting the gain to a gain that decreases with signal amplitude (see Figs. 3A through 3C) and claim 27 further limiting the amplifier to a differential transistor pair having a predetermined tail current (I_{EE} in Fig. 4).

It is respectfully submitted that the rejection of any claims now in the case using Nakano as the primary reference is improper for the foregoing reasons.

Claims 4, 11 and 18 were rejected on Nakano in view of Jin and further in view of Dexter. The examiner makes reference to Fig. 3 of Dexter and notes that Dexter's purpose in that circuit is to reduce harmonic distortion. Note however, that the circuit of Fig. 3 of Dexter has a single frequency input, not two frequencies, and that the circuit effects distortion, not isolation between two frequencies. Therefore Dexter is of background interest only, if relevant at all. Note also that the examiner is combining a large number of references when there is no suggestion in any of the references that they could be combined, and further, that when combined, do not yield a combination in accordance with the present invention, or a combination that could achieve the purposes of the present invention. Therefore reconsideration of this rejection is respectfully requested.

Claims 5, 12 and 19 were rejected on Nakano, Jin, Dexter and Souetinov. Souetinov in Fig. 4 discloses a differential transistor pair used for a local oscillator driver for a mixer, the driver being configured to have a high common mode impedance (see Abstract and col. 5, lines 1 through 9). Thus this circuit is configured for a different purpose in a single mixer frequency circuit. Note again that the examiner is combining a large number of references when there is no suggestion in any of the references that they could be combined, and further, that when combined, do not yield a combination in accordance with the present invention, or a combination that could achieve the purposes of the present invention.

Claims 14 through 16 were rejected on Nakano, Jin and Taylor, Taylor showing an image rejection filter. The present invention is the overall combination claimed, while in this as well as the other rejections in the office action, the examiner is merely finding individual elements in different patents used for different purposes, and attempting to combine them when any such combination, if realizable at all, would not provide the results of the claimed combination. Again the examiner is combining a large number of references when there is no suggestion in any of the references that they could be combined, and further, that when combined, do not yield a combination in accordance with the present invention, or a combination that could achieve the purposes of the present invention.

Claim 21 was rejected on Nakano, Jin and Cheah. The comments made above with respect to claims 14 through 16 apply to this rejection also.

For the foregoing reasons, reconsideration of the rejected claims remaining in the case, as well as consideration of the new claims, is respectfully requested.

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Notice of References Cited (Form PTO-892)

The examiner cites U.S. Patent No. 5,574,755 as a basis for rejection but does not list this reference on the Notice of References Cited. Applicant respectfully requests that the examiner cite this reference on a supplemental Notice of References Cited with the next communication.

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CONCLUSION

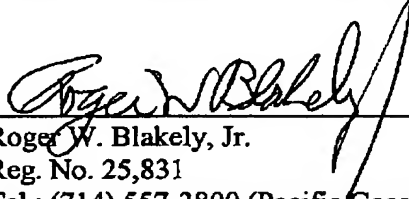
Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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By


Roger W. Blakely, Jr.
Reg. No. 25,831
Tel.: (714) 557-3800 (Pacific Coast)

12400 Wilshire Boulevard, Seventh Floor
Los Angeles, California 90025

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Jessica A. Clark
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